

<<=====Exercise 6,7=====>>

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TASK:

Create a new package nodes\_practical in the  
existing catkin\_ws

```
student@ubuntu:~$ sudo apt-get install ros-noetic-catkin
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
E: Unable to locate package ros-noetic-catkin
student@ubuntu:~$ cd ~/catkin_ws/src
student@ubuntu:~/catkin_ws/src$ catkin_create_pkg nodes_practical std_msgs rospy
roscpp
usage: catkin_create_pkg [-h] [--meta] [-s [SYS_DEPS [SYS_DEPS ...]]]
                        [-b [BOOST_COMPS [BOOST_COMPS ...]]] [-v PKG_VERSION]
                        [-D DESCRIPTION] [-l LICENSE] [-a AUTHOR]
                        [-m MAINTAINER] [--roscdistro ROSDISTRO]
                        name [dependencies [dependencies ...]]
catkin_create_pkg: error: File exists: /home/student/catkin_ws/src/nodes_practical/
CMakeLists.txt
student@ubuntu:~/catkin_ws/src$ cd ..
student@ubuntu:~/catkin_ws$ catkin build
-----
Profile:                                default
Extending:                             [cached] /opt/ros/melodic
Workspace:                             /home/student/catkin_ws
-----
Build Space:                           [exists] /home/student/catkin_ws/build
Devel Space:                           [exists] /home/student/catkin_ws/devel
Install Space:                         [unused] /home/student/catkin_ws/install
Log Space:                             [exists] /home/student/catkin_ws/logs
Source Space:                         [exists] /home/student/catkin_ws/src
DESTDIR:                               [unused] None
-----
Devel Space Layout:                    linked
Install Space Layout:                  None
-----
Additional CMake Args:                 -GEclipse CDT4 - Unix Makefiles -
DCMAKE_BUILD_TYPE=Release -DCMAKE_CXX_COMPILER_ARG1=-std=c++11 -
D__cplusplus=201103L -D__GXX_EXPERIMENTAL_CXX0X__=1
Additional Make Args:                  None
Additional catkin Make Args:           None
Internal Make Job Server:              True
Cache Job Environments:                 False
-----
Whitelisted Packages:                  None
Blacklisted Packages:                  None
-----
Workspace configuration appears valid.
-----
[build] Found '2' packages in 0.0 seconds.
[build] Updating package table.
```

```

Starting >>> nodes_practical
Starting >>> sjtu_drone
Finished <<< sjtu_drone [ 0.4 seconds ]
Finished <<< nodes_practical [ 3.4 seconds ]
[build] Summary: All 2 packages succeeded!
[build] Ignored: None.
[build] Warnings: None.
[build] Abandoned: None.
[build] Failed: None.
[build] Runtime: 3.4 seconds total.
[build] Note: Workspace packages have changed, please re-source setup files to use
them.
student@ubuntu:~/catkin_ws$ source devel/setup.bash
student@ubuntu:~/catkin_ws$ cd
student@ubuntu:~$ echo "source devel/setup.bash">>~/.bashrc
student@ubuntu:~$ echo ROS_PACKAGE_PATH
ROS_PACKAGE_PATH
student@ubuntu:~$ echo $ROS_PACKAGE_PATH
/home/student/catkin_ws/src/nodes_practical:/home/student/catkin_ws/src/sjtu-
drone:/opt/ros/melodic/share
student@ubuntu:~$ cd ~/catkin_ws/src
student@ubuntu:~/catkin_ws/src$ catkin_create_pkg nodes_practical std_msgs rospy
roscpp actionlib actionlib
usage: catkin_create_pkg [-h] [--meta] [-s [SYS_DEPS [SYS_DEPS ...]]]
                        [-b [BOOST_COMPS [BOOST_COMPS ...]]] [-V PKG_VERSION]
                        [-D DESCRIPTION] [-l LICENSE] [-a AUTHOR]
                        [-m MAINTAINER] [--roscdistro ROSDISTRO]
                        name [dependencies [dependencies ...]]
catkin_create_pkg: error: File exists: /home/student/catkin_ws/src/nodes_practical/
CMakeLists.txt
student@ubuntu:~/catkin_ws/src$ ls
nodes_practical sjtu-drone
student@ubuntu:~/catkin_ws/src$ cd ..
student@ubuntu:~/catkin_ws$ ls
build devel logs src
student@ubuntu:~/catkin_ws$ cd src
student@ubuntu:~/catkin_ws/src$ ls
nodes_practical sjtu-drone
student@ubuntu:~/catkin_ws/src$ cd nodes_practical
student@ubuntu:~/catkin_ws/src/nodes_practical$ mkdir scripts
student@ubuntu:~/catkin_ws/src/nodes_practical$ ls
CMakeLists.txt include package.xml scripts src
student@ubuntu:~/catkin_ws/src/nodes_practical$ cd scripts
student@ubuntu:~/catkin_ws/src/nodes_practical/scripts$ touch listner.py
student@ubuntu:~/catkin_ws/src/nodes_practical/scripts$ ls
listner.py
student@ubuntu:~/catkin_ws/src/nodes_practical/scripts$ touch talker.py
student@ubuntu:~/catkin_ws/src/nodes_practical/scripts$ ls
listner.py talker.py
student@ubuntu:~/catkin_ws/src/nodes_practical/scripts$

```

TASK 2:  
ROS node

```

student@ubuntu:~$ roscore
... logging to
/home/student/.ros/log/96a0f498-bfcb-11ea-9304-000c29d46a4e/roslaunch-ubuntu-
3363.log

```

Checking log directory for disk usage. This may take awhile.  
Press Ctrl-C to interrupt  
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://ubuntu:34169/  
ros\_comm version 1.14.3

SUMMARY  
=====

PARAMETERS  
\* /rostdistro: melodic  
\* /rosversion: 1.14.3

NODES

auto-starting new master  
process[master]: started with pid [3373]  
ROS\_MASTER\_URI=http://ubuntu:11311/

setting /run\_id to 96a0f498-bfcb-11ea-9304-000c29d46a4e  
process[rosout-1]: started with pid [3384]  
started core service [/rosout]

.....  
student@ubuntu:~\$ rosrunc turtlesim turtlesim\_node  
[ INFO] [1594069178.349013532]: Starting turtlesim with node name /turtlesim  
[ INFO] [1594069178.359942804]: Spawning turtle [turtle1] at x=[5.544445],  
y=[5.544445], theta=[0.000000]

.....  
student@ubuntu:~\$ rosrunc turtlesim turtle\_teleop\_key  
Reading from keyboard

-----  
Use arrow keys to move the turtle.

.....  
student@ubuntu:~\$ rostopic -h  
rostopic is a command-line tool for printing information about ROS Topics.

Commands:

```
rostopic bw display bandwidth used by topic
rostopic delay    display delay of topic from timestamp in header
rostopic echo     print messages to screen
rostopic find     find topics by type
rostopic hz display publishing rate of topic
rostopic info     print information about active topic
rostopic list     list active topics
rostopic pub      publish data to topic
rostopic type     print topic or field type
```

Type rostopic <command> -h for more detailed usage, e.g. 'rostopic echo -h'

student@ubuntu:~\$ rostopic  
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rostopic find      find topics by type
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rostopic info      print information about active topic
rostopic list       list active topics
rostopic pub        publish data to topic
rostopic type       print topic or field type

```

Type `rostopic <command> -h` for more detailed usage, e.g. `'rostopic echo -h'`

```

student@ubuntu:~$ rostopic bw -h
Usage: rostopic bw /topic

```

Options:

```

-h, --help          show this help message and exit
-w WINDOW, --window=WINDOW
                    window size, in # of messages, for calculating rate

```

```

student@ubuntu:~$ rostopic echo -h
Usage: rostopic echo [options] /topic

```

Options:

```

-h, --help          show this help message and exit
-b BAGFILE, --bag=BAGFILE
                    echo messages from .bag file
-p                 echo in a plotting friendly format
-w NUM_WIDTH        fixed width for numeric values
--filter=FILTER-EXPRESSION
                    Python expression to filter messages that are printed.
                    Expression can use Python builtins as well as m (the
                    message) and topic (the topic name).
--nostr            exclude string fields
--noarr            exclude arrays
-c, --clear         clear screen before printing next message
-a, --all           display all message in bag, only valid with -b option
-n COUNT           number of messages to echo
--offset           display time as offsets from current time (in seconds)

```

```

student@ubuntu:~$ rostopic info -h
Usage: rostopic info /topic

```

Options:

```

-h, --help show this help message and exit

```

```

student@ubuntu:~$ rostopic list -h
Usage: rostopic list [/namespace]

```

Options:

```

-h, --help          show this help message and exit
-b BAGFILE, --bag=BAGFILE
                    list topics in .bag file
-v, --verbose        list full details about each topic
-p                 list only publishers
-s                 list only subscribers
--host              group by host name

```

```

.....
student@ubuntu:~$ rostopic echo /turtle1/cmd_vel

```

linear:

```

x: 0.0
y: 0.0
z: 0.0

```

angular:

```

x: 0.0

```

```
y: 0.0
z: -2.0
```

```
---
```

```
linear:
  x: 2.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 0.0
```

```
---
```

```
linear:
  x: 0.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 2.0
```

```
---
```

```
linear:
  x: 0.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 2.0
```

```
---
```

```
linear:
  x: 2.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 0.0
```

```
---
```

```
.....
student@ubuntu:~$ rosrn rqt_plot rqt_plot
```

```
.....
student@ubuntu:~$ rostopic hz /turtle1/pose
```

```
subscribed to [/turtle1/pose]
```

```
average rate: 62.501
```

```
min: 0.015s max: 0.017s std dev: 0.00034s window: 59
```

```
average rate: 62.515
```

```
min: 0.015s max: 0.017s std dev: 0.00026s window: 122
```

```
average rate: 62.487
```

```
min: 0.015s max: 0.017s std dev: 0.00034s window: 184
```

```
average rate: 62.501
```

```
min: 0.015s max: 0.017s std dev: 0.00036s window: 247
```

```
average rate: 62.494
```

```
min: 0.015s max: 0.017s std dev: 0.00037s window: 310
```

```
average rate: 62.503
```

```
min: 0.015s max: 0.017s std dev: 0.00035s window: 372
```

```
average rate: 62.497
```

```
min: 0.014s max: 0.017s std dev: 0.00035s window: 435
```

```
average rate: 62.500
```

```
min: 0.014s max: 0.017s std dev: 0.00032s window: 497
average rate: 62.496
min: 0.014s max: 0.017s std dev: 0.00032s window: 560
average rate: 62.499
min: 0.014s max: 0.017s std dev: 0.00032s window: 623
```

```
.....
student@ubuntu:~$ rostopic type /turtle/smd_vel
unknown topic type [/turtle/smd_vel]
student@ubuntu:~$ geometry_msgs/Twist
bash: geometry_msgs/Twist: No such file or directory
student@ubuntu:~$ rosmmsg show geometry_msgs/Twist
geometry_msgs/Vector3 linear
  float64 x
  float64 y
  float64 z
geometry_msgs/Vector3 angular
  float64 x
  float64 y
  float64 z
```

FileEditViewVMTabsHelp

Library

My Computer

Ubuntu\_18\_04\_RC

Shared VMs

Home

Ubuntu\_18\_04\_ROS\_Course

Activities

rqt\_plot

roscore http://ubuntu:11311/

File Edit View Search Terminal Help

Press Ctrl-C to interrupt

Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://ub

ros\_comm version 1.14.3

SUMMARY

=====

PARAMETERS

\* /rostdistro: melodic

\* /rosversion: 1.14.3

NODES

auto-starting new master

process[master]: started with pid

ROS\_MASTER\_URI=http://ubuntu:11311

settling loop id to 963ef408-b5eb-4

File Edit View Search Terminal Help

\* /statistics [rosgraph\_msgs/Top

student@ubuntu:~\$ rostopic type /t

unknown topic type [/turtle1/smd\_ve

student@ubuntu:~\$ geometry\_msgs/Tw

bash: geometry\_msgs/Twist: No such

student@ubuntu:~\$ rosmmsg show geometry\_msgs/Twist

geometry\_msgs/Vector3 linear

float64 x

float64 y

float64 z

geometry\_msgs/Vector3 angular

float64 x

float64 y

float64 z

student@ubuntu:~\$ rostopic type /turtle1/command\_velocity

unknown topic type [/turtle1/command\_velocity]

student@ubuntu:~\$ rosmmsg show turtlesim/Velocity

Unable to load msg [turtlesim/Velocity]: Cannot locate message [Velocity] in pac

package [turtlesim] with paths [['/opt/ros/melodic/share/turtlesim/msg']]

student@ubuntu:~\$ rostopic pub [topic] [msg\_type] [args]

ERROR: invalid topic type: [msg\_type]

student@ubuntu:~\$

rqt\_graph\_RosGraph - rqt

Node Graph

Nodes only

Group: 2

Namespaces

Actions

tf

Images

Highlight

Fit

Hide: Dead sinks

Leaf topics

Debug

tf

Unreachable

Params

/teleop\_turtle

/turtle1/cmd\_vel

/turtlesim

student@ubuntu:~

TurtleSim

linear:

x: 0.0

y: 0.0

z: 0.0

angular:

x: 0.0

y: 0.0

z: -2.0

---

linear:

x: 2.0

y: 0.0

z: 0.0

angular:

x: 0.0

y: 0.0

z: 0.0

---

linear:

x: 0.0

y: 0.0

z: 0.0

rqt\_plot\_Plot - rqt

MatPlot

Topic/

autoscroll

1.0

0.8

0.6

0.4

0.2

0.0

0.0

0.2

0.4

0.6

0.8

1.0